AMATEUR SATELLITE REPORT

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AMSAT's® *Newsletter for the Amateur Radio Space Program*

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Urgent Alert

Because of the rapidly falling solar power available to AO-10, its use during March and April is expressly prohibited! If this prohibition is strictly observed, the spacecraft will again be available for use beginning in May. (See story in *ASR* #143).

TAPR To Produce Multi-Use Packet Modem

As previously reported in these pages, TAPR, the Tucson Area Packet Radio group, has been evaluating the feasibility of producing a special modem for use with FO-12, Mode JD, but with added functionality to broaden its utility. Now Lyle Johnson, WA7GXD, TAPR President, has announced plans for a limited production run of these modems.

According to Lyle, the modems will include an FSK modulator and PSK demodulator configured for use with FO-12 Mode JD, the digital mode. It will include a digital AFC with an interface suitable for controlling the frequencies of the newer ICOM, Kenwood and Yaesu transceivers with external frequency control inputs. Significantly, the TAPR modem will also include a PSK modulator. This will also allow the modem's use over terrestrial links with comparably equipped stations. Terrestrial PSK-equipped packet radio stations may expect a very significant performance improvement over conventional FSK-equipped stations.

The effect of the more sophisticated PSK technique over FSK is to allow recovery of weaker signals for a given error rate or, conversely, to reduce the error rate with a signal of a given strength. In some cases the added benefit could be the equivalent of adding a 10 dB power amplifier to the link.

The new TAPR modem will be supplied in kit form and will include, says WA7GXD, the three PCBs and all required parts except the enclosure cabinet. These are available at Radio Shack, Johnson said. The price will be in the $85 range and 100 units will be produced in the first production run, Lyle added.

The circuit is similar to one which appeared in the AMSAT/ARRL technical publication, QEX a few months ago, based on the Japanese design formulated a year ago. Key enhancements include, among others, the addition of optocouplers for the interface to the transceiver's frequency control input. These signals enable the AFC function. The modem requires a power input of not less than 11 volts AC or DC. Orders will be taken beginning about March 1st at the TAPR telephone which is: 602-746-1166. Additional details on this modem may be found in *ASR* #135, 137, 138 and 141.

RS-9, 10 Launch Appears Delayed Until Spring

The launch of RS-9 and RS-10 was still on hold at press time. It is unclear what the cause of the delay is but continued speculation pointed to the launch backlog attributed to the cold weather. RS-9 is thought to have a Mode A transponder and a robot aboard. RS-10 carries Modes A, K, T and robot transponders. According to UA3CR, as quoted by G3IOR, an April launch now seems likely for these new birds.

Frequencies for these transponders were published in *ASR* #140. Monitor the AMSAT nets for the latest news on these new birds. A special AMSAT NA launch net will be held on 75 meters the evening of the launch beginning at 0100 UTC.

Russians Begin New Era in Manned Space Activity

The Soviet Union successfully launched two Cosmonauts to low earth orbit early Friday, February 6. The launch, seen on television throughout the USSR and much of Europe, marks the opening of a era in manned space activity. The ascent to orbit was uneventful. The Cosmonauts were reported to have docked with the huge Mir Space Station late on Saturday, 7 February. The launch, coming at 12:38 AM Moscow time, was from the major launch site at the Baikonur Cosmodrome at Tyuratam in Soviet Central Asia. It is thought the launch may have been delayed several days because of the cold wave which has severely affected the area.

The Cosmonauts will stay aboard Mir for as long as 290 days. However, according to the authoritative trade journal *Aviation Week & Space Technology*, the present manned space mission will mark the beginning of a permanent Soviet manned presence in space aboard Mir and the modules subsequently docked to it. A Syrian Cosmonaut and another Russian will be launched in a few months to join the two-man crew now resident on Mir. The first science module is being prepared for an April launch according to *Aviation Week*. It is an astrophysics laboratory, the magazine said.

Neither of the two Cosmonauts launched are licensed Amateurs. Nevertheless, persistent rumors originating in Europe suggest strongly an Amateur Radio activity will eventually be coupled with Mir Space Station activity. It is not clear how far in the future this may happen.

Short Bursts

• Tak Okimoto, JA2PKI, reports a new program was loaded in the FO-12 Mode JD beacon on or about February 8. This could indicate some progress in getting that mode ready for regular use.

• Jan King, W3GEY, AMSAT Director and Engineering Vice President, appears to be heading for a berth on the U.S. delegation to the Mobile World Administrative Radio Council (WARC) meeting this summer. Jan has been employed in the mobile satellite communications industry for the last four years as Vice President of Engineering for Skylink, Inc., of Boulder, Colorado.

• AMSAT NA has received permission from Yaesu USA to use the artwork associated with its FT-726 advertisement as the basis of a new AMSAT QSL card. The artwork shows a rendering of AO-10 against a star background and uses a NASA Apollo photograph of earth. See cover 3 of *QST* for December, 1984. The artwork was produced by Don Tate Associates of Los Angeles for Yaesu. AMSAT NA is considering producing an "official" QSL card for its members' use but no final decision has yet been made on this matter.

• Tom Gentry, K5VOU, of Encomm in Dallas says the autotracking interface for the IBM-PC and Ken-Pro rotor systems is now ready. Used with AMSAT NA tracking software, the Model KR-010 is used with the Ken-Pro model KR-5400A or KR-5600A rotors and will permit automatic satellite tracking. The IBM-compatible unit will use the AMSAT NA/WØSL tracking program. An Encomm unit previously announced is the Model KR-001 which runs with the Commodore 64 and the AMSAT MAPTRAK program. AMSAT had a demonstration unit of the C-64 model autotracking at the recent Miami convention.

• 7J1ACH has been on AO-10. Operator "Rich" is on Minami Torishima island for a few month's work.

• AO-10 apogees are now in the Northern Hemisphere. The landmark crossing occurred on orbit 2725 on January 27. After that date, apogees occurred north of the equator. That means maximum north-south DX range is now at hand.

• According to G3IOR, talks are planned between UA and VE officials which may result in a joint polar expedition covering UAØ to VE8. Pat says UA3CR is tentatively part of the team which will navigate using satellites and communicate using the RS birds if possible.

• Two radio experimenters in the USSR, UA9FAD and UL7GBD, are using the Mir Space Stations and possibly the ionized trail it leaves as a radio reflector. Details are in a DOSAAF paper G3IOR is providing to *ASR*. *ASR* will translate the paper and provide key excerpts here.

Pittsburgh to Host 1987 National L-5 Conference

The L-5 Society's 6th Space Development Conference will be held March 27-29, 1987, at The Pittsburgh Hilton. Under the theme "Return to the Vision," the gathering will probe the future of manned space travel—with distinguished participants from business, industry, academics and government exploring the challenges and opportunities the next 50 years will bring.

Activities currently include workshops and seminars on:

Innovative Space Systems: Chairpersons Dr. David Webb, member of the National Commission on Space, and Dr. Richard Parker of the North Dakota Center for Aerospace Science will emphasize closed ecological life support systems.

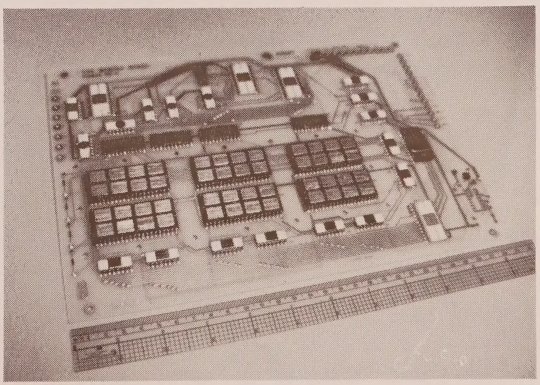
Basic Spaceflight: Capt. Edward Daley, United Airlines, and Gregg Maryniak, Space Studies Institute Vice President, will teach orbital mechanics, proximity operations and propulsion systems. Daley and Maryniak have trained groups of students from a wide range of organizations—including airlines, planetariums, NASA and private aerospace companies on these topics.

Space Education: This seminar aims at building an awareness of the history and opportunities of the space program among educators and students of all ages.

Space Defense: Gen. Daniel O. Graham and other experts will discuss defense issues.

Arts: Activities include the performing arts, sculpting, painting, writing and photography. An accompanying show will feature works by Alan Bean, Jack Olsen, Robert Rauschenberg, Kim Poor, Kelly Freas and other renowned artists of the space age.

L5 conference co-chairman, Dale Amon of Carnegie-Mellon University's Center for Art & Technology, sees "enormous propects" awaiting man in space.



The Phase 3C flight IHU memory, with the new Harris radiation hardened memory chips, has been powered up and runs perfectly according to IHU Project Engineer Gordon Hardman, KE3D.

"Many of the problems we face today—from incurable diseases to nuclear energy and toxic waste—can be solved in the next several years by developments in space," said Amon. "Our future technological capabilities will make the space station look like a log cabin."

He added that "as the National Commission on Space report indicates, people are alive today who will live on other worlds."

The largest organization of its kind in the world, The L-5 Society (named for a point between the earth and the moon) brings together leading academicians, scientists, engineers, business people, government officials and others involved in the future of manned space exploration and development.

Attending the recent IARU Region 2 Conference in Buenos Aires recently were (l-r) Masa Fujiuka, JM1UXU; Carlos Huertas, LU4ENG; Shozo Hara, JA1AN; Nao Akiyama, N1CIX.

AMSAT 75 Meter Net Frequency Changed; Survey Scope Increased

As reported in *ASR* #143, the AMSAT NA 75 meter nets (Tuesday evenings local time) have moved to the Advanced portion of the 75-meter band (below 3850 kHz). The exact nominal frequency of the net is pending a survey being performed by WØRPK, WØCY and W8GQW. Until the results are tabulated, the net will set up shop on 3840 ± 10 kHz.

In related news, *ASR* will be publishing a complete net roster as soon as editors are assured the listing is current and accurate. In a major expansion of this project, the voice net listing will be included in a much broader listing titled "AMSAT Information Services Worldwide". Besides the voice net listing, the info services table will list packet radio bulletin boards that regularly file AMSAT News Service bulletins as well as dial-up bulletin board services such as WØRPK's.

Therefore, if you are a net manager or net control station and wish your AMSAT net listed on AMSAT NA's master net roster, or if you operate or know of a packet radio or dial-up bulletin board that supplies AMSAT News Service bulletins, please let us know as soon as possible. Deadline for inputs is now April 9, 1987. Mail details to AMSAT NA Headquarters, P.O. Box 27, Washington, D.C. 20044.

New Shuttle GAS Can Project to Add Amateur Radio Package

AMSAT is discussing operational concepts for a new Shuttle-borne package with a group which has already deployed a satellite from a Get-Away-Special Canister or GAS Can. According to AMSAT President Vern Riportella, WA2LQQ, satellite engineers at Weber State College in Ogden, Utah, have decided to add an Amateur Radio transponder to the primary payload, an experiment to calibrate Federal Aviation Administration (FAA) radars from space.

Called NUSAT-II, the GAS Can will be flown on a Space Shuttle sometime between 1988 and 1990. This is a follow-on mission to NUSAT-I which was launched by the ill-fated Shuttle Challenger some 22 months ago. NUSAT-I re-entered the atmosphere on 16 December 1986. (See *ASR* #140).

According to NUSAT (Northern Utah Satellite) project engineer Bill Clepp, plans for the Amateur Radio

AMSAT Information Services Worldwide
Updated as of 15 Feb 87
Voice Nets, Packet Radio BBS and Telephone Dial-Up BBS

Part 1. Voice Nets

Net Designation	Day	Time	Freq	NCS(Primary)	Notes
International					
AMSAT International	Sunday	1900 UTC	14.282 MHz	WDØHHU	
AMSAT International	Sunday	1800 UTC	21.280	WDØHHU	1
AMSAT South Pacific	Saturday	2200 UTC	14.282	W6SP	2
National					
AMSAT UK	Sunday	1015 local	3.780	G8AUK	
AMSAT UK	Mon + Wed	1900 local	3.780	G8AUK	
SA AMSAT	Sunday	0900 UTC	14.280	ZS6AKV	
SA AMSAT	Sunday	0900 UTC	7.080	ZS6AKV	
AMSAT VK	Sunday	1000 UTC	3.685	VK5AGR	8
Regional					
AMSAT NA East Coast 75m	Wednesday	2000 EST	3.840	WA2LQQ	3
AMSAT NA Mid-America 75m	Wednesday	2100 CST	3.840	WØCY	3
AMSAT NA West Coast 75m	Wednesday	2000 PST	3.840	N6TE	3
Local					
*USA					
Los Angeles 2m	Wednesday	2000 PST	144.144	W6SP	
Los Angeles 2m	Daily	0730 PST	144.144	W6KAG	
AMSAT South Pacific/LA	Sunday	2200 UTC	144.144	W6SP	5
Cent Cal OSCAR AMSAT Net	Tuesday	2000 PST	147.150	WB6GFJ	4
East Coast 75m/NYC	Tuesday	2000 EST	144.280	WA2LQQ	6
Colorado AMSAT Net	Wednesday	0300 UTC	147.225	WBØRLY WDØOFVV/R	
Houston Area AMSAT Net	Tuesday	2200 CST	145.450	WA5ZIB WB5RDK/R	
Chicago Area AMSAT Net	Wednesday	1930 CST	146.880	WD9IIC K9GFY/R	7
Miami Area AMSAT Net	Tuesday	2000 EST	146.925	N4IFD WA4ARD/R	9
*South Africa					
SA AMSAT	Sunday	0900 UTC	145.650	ZS6AKV	
*UK					
England: Brighton Area	Sundays	1915 local	144.280	G6ZRU	
Scotland: Paisley	Daily	0900 local	144.625	GM1SXX	

Part 2. Packet Radio BBS carrying AMSAT News Service Bulletins

Location	Callsign	Frequency	Notes
Portula Valley, CA	N6IIU-1	145.01	Central California
???	WA6YHJ-1	145.01	Central California
???	W6CUS-1	145.09	Central California
Silver Spring, MD	N4QQ-1	145.03, 145.05	
Harrisburg, PA	WB3EYB-1	145.05	
Clarksville, MD	W3IWI-1	145.05. 221.???	
Medford, NJ	WB2MNF-1	145.03	

Part 3. Dial-up BBS

System Operator	Telephone	Location	Notes
Ralph Wallio, WØRPK	515-961-3325	Iowa	300 or 1200 baud
Jeff Wallach, N5ITU	214-340-5850	Texas	"Datalink"

Notes:
1. Net inactive as of February 1987. Reactivation beginning in 1987 or when improving conditions allow is under study.
2. This net may return to 21.280 later in 1987 if propagation conditions permit.
3. Interim frequency; frequency is ± 10 kHz.
4. WA6YCZ/R; additional links on K6GWE/R, 443.525; W6OA/R, 146.655; KU6A/R, 223.720.
5. Two-meter simulcast of HF net by W6SP.
6. Two-meter simulcast of HF net by WA2LQQ.
7. PL 1B required for access.
8. Back-up frequency is 7.064 MHz.
9. Real-time retransmission of East Coast 75m net.

transponder on NUSAT-II now focus on the idea of a voice-in, voice-out single channel store-and-forward repeater. Clepp says their concept involves digitizing a 2-meter FM voice uplink, storing it in one megabyte of solid-state memory and then dumping selected portions of it via a voice synthesizer on a 2-meter FM downlink.

In other GAS Can news, HOUSAT is the name being adopted by the Packet Technology Satellite Experiment (PTSE) team in Houston, this according to Project Leader, Gerry Creager. The AMSAT Board of Directors recently voted to fund a HOUSAT startup for initial design and prototypes. HOUSAT intends to use the same GAS Can deployment mechanism pioneered by NUSAT-I (See *ASR* #137, page 3.)

Also in the same category is EDSAT, an educational satellite being developed by a team at Richland Community College, Decatur, Illinois, under the leadership of long-time AMSAT member Frank Wiesenmeyer, K9CIS. EDSAT similarly plans to deploy from their GAS Can using the NUSAT mechanism. EDSAT has a GAS Can reservation with NASA although a specific launch date and mission remains to be defined.

UO-11 Maneuvers Continue; New Keplerian Distribution Forecast

A complex series of attitude maneuvers continues on UO-11. The series is designed to de-stabilize the "inverted" spacecraft and then re-capture gravity-gradient lock with the CCD camera Earth-pointing, according to the University of Surrey.

Meanwhile, Steve Holder of Surrey has incorporated additional features within the DAIRY system to allow the On Board Computer (OBC) to support this work without interrupting the overall schedule. It should be noted, however, that UO-11 will be switched into Dwell Telemetry at times while in range of Surrey.

Further thought has been given to the optimum use of the UoSAT Bulletin Service and to the dissemination of Orbital data in particular. A new scheme has been devised whereby the UO-11 Digital Communications Experiment, the DCE, will carry the Orbit Data as "Title Frames". This will allow the dual advantages of regular, easily updated data without having to reload the DIARY and provision of a regularly transmitted source of ERROR-CODED DATA.

According to G3YJO, this scheme will:

1) allow UO-11 to carry Keplerian data without taking up space on the Bulletin

2) transmit this data on every pass in an error-protected format so that you know that you have correct data.

3) allow Surrey to update the Keplerian data easily through the DCE without having to reload the DIARY.

4) encourage more active listeners to the DCE.

Surrey will endeavor to publish details of how one should receive and decode this new DCE service when appropriate.

AMSAT®

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Attendees at the recent IARU Region 2 Conference in Buenos Aires included Carlos Huertas, LU4ENG, (left) Irwin Provence, P43IDP, (center) and Dave Sumner, K1ZZ, IARU Secretary.

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